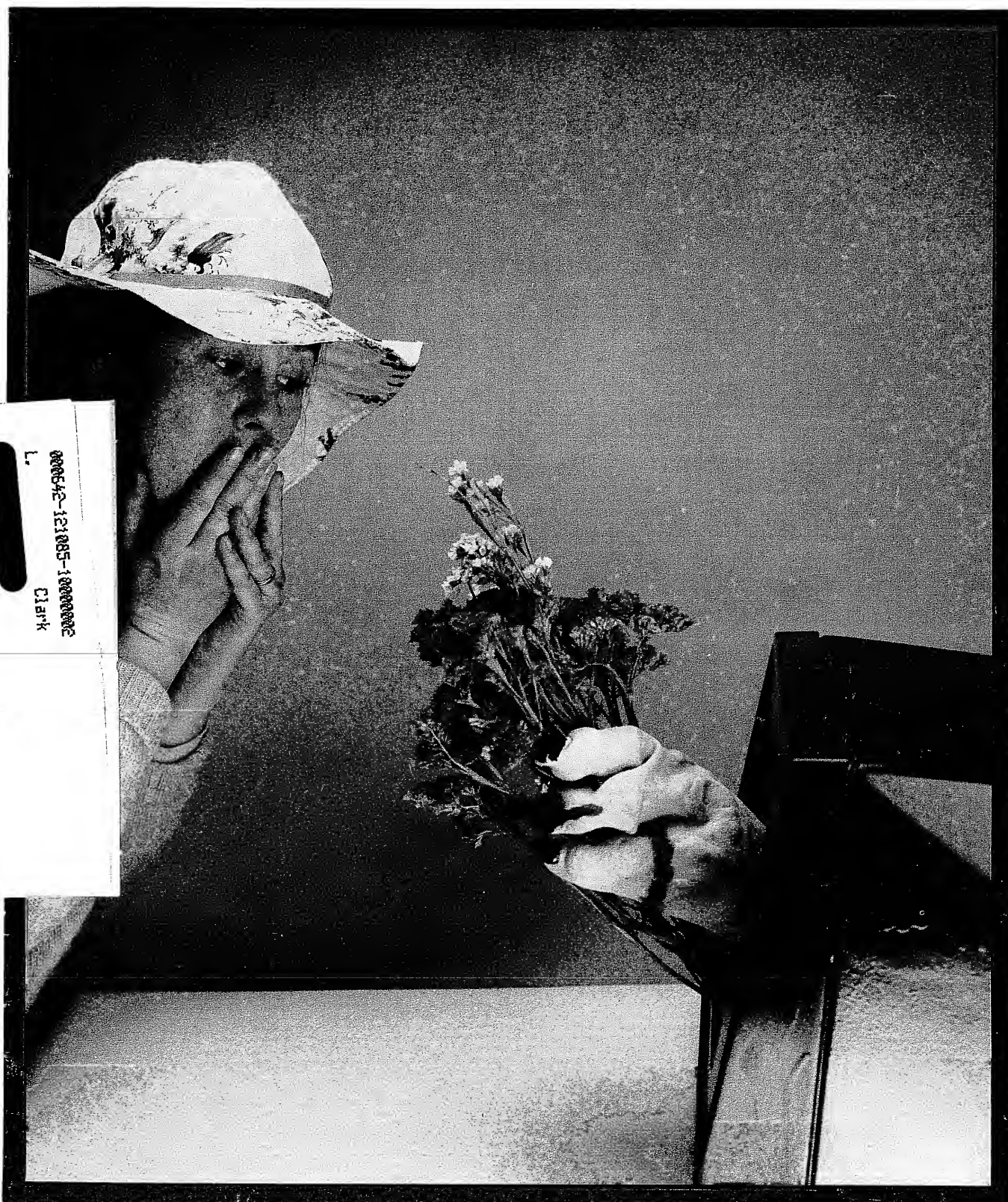


# UNDERCOLOR

**Vol. 1 No. 10**

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*A friend of mine showed me a game he'd programmed. He owns an Apple II. He programmed the game using a disk called "The Arcade Machine," by Broderbund Software.*

*I was wondering if there is any disk like The Arcade Machine, which used simple one-word commands to program games, available for the Color Computer? If so, where may I get one?*

Vince Matthews  
Clinton, NC

"The Game Machine" is the only program I've heard of that does what you want. The program is sold on a ROMpak and you must use the ROMpak to play the games you create. In other words, you can't make a game and then give it to a friend. To play it your friend would have to have The Game Machine ROMpak. Unfortunately, I can't find the manufacturer's address.

Spectrum Projects (P.O. Box 21272, Woodhaven, NY, 11421) sells "Bjork Blocks," a utility for creating graphics screens for use in games.

Sorry I can't help you more.

*I wish to thank Robert C. Lake, CDP, for writing the excellent program MOVSCRIP which appeared in The Color Computer Magazine in August 1983.*

*As you know, it can be used to customize printing from the Radio Shack Scipsit ROMpak to the Radio Shack LP VII printer. However, I have a Radio Shack DMP-120 printer which uses different codes for wide printing. The program runs fine except it doesn't do wide printing. I'm thankful to be able to have a back-up to the ROMpack but sure wish I could change the printing.*

*Since I got a tape from the Scipsit ROMpack, I figured I could solve my old problem of wipeouts of Radio Shack "Spectaculator" by using the same program. It didn't work out. The program ran up to line 610 where I got an FC error. the original line 610 is; POKE(J-24576,PEEK(J-24576)-(24576/256). Can anyone help with either of these two problems?*

Jim Fairchild  
Newark, DE

All you have to do is substitute the DMP width codes for the LP VII code in the program. Look up the codes in your manual and re-run the modified program on your Scipsit cartridge.

Your second problem is that the value Scripmov derives for J is incorrect for Spectaculator, hence the FC error. Unfortunately I don't have Spectaculator, so I can't help you. Does anyone else have a solution?

*In the November, 1983 issue of TCCM, you answer an inquiry as follows: "Your computer may already have 64K RAM, you just can't access it. If you have the latest board, all you need is software (such as Telewriter-64 and Super Color Writer 3.0) to access the full 64K capability." I have the 64K RAM and the latest board, checked out recently by Computer Plus in Littleton, Mass. However, with Telewriter-64 I can only reach 24,896. I have therefore just purchased VIP Writer which gets me 41,668. Furthermore, I note in the recent ads for VIP Writer they claim I should be able to get up to 50,000.*

*I was totally satisfied with the Telewriter-64 I was used to and liked but wanted the extra room that VIP Writer gave me without getting involved with Flex, etc. I would still like to use my Telewriter-64 if I could get more memory out of it. Have you any suggestions?*

Monte G. Basbas  
Wayland, MA

I suggest calling Cognitec directly and asking them what gives with the version of Telewriter you have. It should take advantage of the full memory of your computer.

*I have a Color Computer, roughly one year old. Three months ago I had somebody I know do a 32K piggyback upgrade; however, certain software wouldn't load into 32K RAM so I invested in 64K chips. The 64K upgrade went easily (I followed instructions from Dennis Kitsz of Green Mountain Micro), but—with each type upgrade in the computer I have sometimes experienced the cursor not moving past its home position (to borrow an Apple term) upon power-up. When I unplug and walk away for a while, the computer returns to normal. The required time away from the computer varies from five minutes to 30 minutes.*

*Why does this happen? Are the upgrades at fault? Is it my old (Sears) TV or printer or disk drive giving a current surge?*

*And finally, what damage will this cause, other than to my mental health?*

Michael Feinberg  
Silver Spring, MD

First, you might have heat-damaged one or more of the electronic components (not that you'd notice by looking at them), causing it/them to mess up the PIA controlling the keyboard.

Second, the keyboard cable might not be properly seated; try unplugging it, inspecting it carefully for

loose connections, cleaning the computer edge-card connector, and reseating the cable.

Third, you could have a bad RAM chip(s) affecting the keyboard rollover table in low RAM.

And finally, the CPU could be malfunctioning. (These last two are very unlikely.)

Or, it could be all these. Before you panic, swap the two PIAs with each other. If one of them is damaged your keyboard problem will cease (but you are just moving the problem elsewhere). If swapping the two chips cures your complaint, order a replacement PIA chip for the bad one (Spectrum Projects sells parts chips).

It probably isn't your upgrades since they either work or don't work. One area of suspicion is the extra address line you had to add: did you put a ferrite bead or dropping resistor on it? If not, that could cause all kinds of EMI interference with memory, but the interference would show up at random times, not just when you were powering up the computer.

Your TV, printer, and disk drives have nothing to do with the problem; to test that out just unplug and leave off the printer and disk drives and turn on the TV long before you turn on the computer. If surges like that were the problem, disconnecting the devices would cure the complaint. Adding a surge suppressor to the computer power line would prevent the problem.

Eventually the problem will reach the point where the computer won't work at all.

I use VIP Writer for almost all my correspondence. In fact, I am so impressed with the program that I sent away to England for the Dragon version, as I own both a CoCo and a Dragon 64.

I bought another program for my CoCo when I was using Color Script instead of VIP Writer, called "Spell 'n Fix (tape version)." This program was very satisfactory before I started to use VIP or Dragon Writer. The Spell 'n Fix program requires a file which is saved in ASCII format to work properly. VIP Writer claims to save its files in this format, but I have not been able to get it to work. I can save files with VIP, and then load them into Color Scripsit and resave them for use with the Spell 'n Fix.

Can you give me some information on this matter?

Charles M. MacLeod  
Taunton, MA

The VIP people tell me that VIP Writer files must be printed to tape rather than saved to tape before the files can be read by spelling checking programs. The technician I talked to wasn't familiar with Spell 'n Fix, but said that if the ASCII file was readable by Scripsit, it should've been readable by Spell 'n Fix. They have their own spelling program for VIP and it reads any file as long as it is in ASCII format, so they couldn't tell me why the VIP files were unreadable by Spell 'n Fix.

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# DataGen

By Stephen P. Allen

When you've written a Basic program that calls an Assembly Language subroutine, the usual procedure is to represent the Assembly Language with data statements that get read and POKEd into memory at run time. For the programmer it can be a real hassle getting those data statements written and put into the program correctly. One misspelled datum and the routine jumps out the window!

DataGen is a utility that vastly simplifies this process. It's based on a program called Append Data by Peter Stoloff that originally appeared in *Color Computer News* (June '83). His program impressed and intrigued me, and I spent some time playing with it . . . here's what I ended up with.

Append Data and DataGen both do the same thing: automatically generate data statements directly into Basic memory. Peter's program used a Basic program to read and POKE an Assembly Language routine, and process the start and end addresses of the memory block to be converted. You'd run Append Data, and have Append Data plus data statements. After deleting Append Data you could type in or otherwise merge your target Basic program.

There are some interesting differences and additions in DataGen: it's pure Assembly Language and can co-reside with any other Assembly Language or Basic programs. In other words, you can have DataGen, your Basic target program, and your Assembly Language routine all in memory

at the same time with no conflict, and produce a finished Basic program instantly.

I've added a checksum routine; a simple "modulo 8" checksum is automatically generated and appended to the data. (In a mod 8 checksum the maximum size of the sum is \$FF, or 255. A rough equivalent in decimal would be to add three and nine and, discarding the carry, get two.)

The data produced are different; here's an example:

**Append Data:** DATABDA1C126FB39

**DataGen:** DATA 189,161,193,38,251,57

You can easily see the difference. His data are much more compact, but also harder to read (I wrote DataGen the way I did just to be different).

DataGen uses two ROM routines that, used together, make keyboard input a snap to implement in your Assembly Language programming. The two routines are at \$A390 and \$9F.

In Basic, whenever you see that flashing multi-color cursor, the 6809 processor is executing the routine at \$A390, Basic's input routine. The device that supplies the input is specified by memory location \$6F (DEVNUM, in Microsoft parlance). The input device can be keyboard or cassette (for CLOADing an ASCII program) in standard Basic. In Extended Basic, \$A390 is used by CLOAD to input from the RS-232 port. I'll discuss keyboard input here, as that's what this program uses.

When \$6F=0, the input device is the keyboard. \$A390 flashes the cursor and waits for key presses. From this routine you can enter text, backspace, clear the current line, or clear the screen. The routine ends when you hit Enter or Break. Upon return, the carry flag is set if the last key was Break, or cleared if the last key was Enter. This makes it easy to JSR \$A390: BCS EXIT, where Exit is a break routine. The B register has the total number of key presses, and the X register points one byte before the address of the keyboard buffer. This routine was designed to be used with another powerful subroutine—the routine at \$9F.

\$9F gets the next character, whose address is contained in \$A6 and \$A7, and evaluates it. It gets the next character from your Basic program when the program is running, and is also used in the tokenization of a typed-in program line after you hit Enter. The address of the next character is part of the routine—it's self-modifying code!

Upon return from \$9F, the A register has the next character. The carry flag is set if the character is within the range \$30–\$39 (ASCII 0–9), providing a quick check for presence of a number. If the character is zero or a colon the zero flag is set. All this using only the A register! That's why the self-modifying code. One other thing, \$9F automatically skips spaces. If it "gets" a space (\$20) it loops back and tries again. Incidentally, by my count, this routine (which can also be called at \$A5, to re-evaluate the current character) is the most often-called routine in the Basic ROMs, followed by the routine that checks for a comma and gives back an \$SN ERROR message if it ain't there.

\$AF67 (Line 410) is the routine Basic uses to evaluate a

typed-in Basic line number. CVTTEX (Line 600) is the same routine rewritten to handle hex input.

\$AD01 (Line 1170) is a routine to find a Basic line in memory. If the line exists its address is returned in the X register and the zero flag is set. If not, either the next higher line's address or the end of the Basic program is returned. The use of this routine makes it possible to execute DataGen several times on the same block of data, overwriting previously produced data statements. Just remember that when DataGen is done, it sets the end of its data statements as the end of your Basic program, and you should normally set a starting line number beyond the highest line number of your Basic program.

When DataGen is done it writes a datum of 1000, then the checksum, which will be a number between zero and 255. A read/POKE routine would go like this:

```
100 CS=0: AD=XXXX 'starting address of routine
110 READ OP: IF OP=1000 THEN 130
120 POKE AD,OP: AD=AD+1:CS=CS+OP AND 255: GOTO110
130 READ CK:IFCK=CS THEN CLEAN EXIT ELSE DATA BAD: END
```

When DataGen is actually generating the program you'll see a brief flash at the bottom of the screen. That's the workspace for CONVTR. I find the speed of assembly language to be an endless source of wonder—here's another chance to see it in action.

DataGen is relocatable (as any utility must be). It ordinarily originates on graphics page 1, where it's out of the way of Basic, but can be shifted around if need be. (end)

## Program Listing: DataGen

```
00200 * ORIGIN IS DN ECB GRAPHICS PAGE ONE:
00210 * CHANGE TO $F00 FOR DISK BASIC
00220
00230 ORG $700
00240
00250
00260
00270
00280 START JSR $A928 clear the screen
00290 LEAX STAD,PCR point to message
00300 BSR PUTMES put it up and get input
00310 CVTTEX convert start address...
00320 STD <$1,PCR ... and store it
00330
00340 LEAX ENDAD,PCR point to message
00350 BSR PUTMES put it up, get input
00360 BSR CVTTEX convert end address...
00370 STD <$2,PCR ...and store it
00380
00390 LINE LEAX LINEENO,PCR point to message
00400 BSR PUTMES put it up, get input
00410 JSR $AF67 convert decimal input
00420 LDD <$2B converted number
00430 BEQ LINE (zero not allowed)
00440 STD <LN,PCR store line number
00450 BSR GETDAT go do it!
00460
00470
00480 * Print a message and get keyboard input
00490
00500 LDDP20 JSR [$A002] print a character
00510 LDA X+ get next character
00520 BNE LOOP20 if not end of message
00530 JSR $A390 else get keyboard input
00540 STX <$A6 point $9F routine to kbd buffer
00550 JMP <$9F get first character and return
00560
00570 *** Convert a typed in Hex number
00580 *** to binary in D register
00590
00600 CVTTEX LDX <$8A zero...
00610 STX <$2B ... to workspace
00620
00630 LBL10 BCS LBL20 if ASCII zero to nine
00640 SUBA #7 else try to make $3A to $3F
00650 CMPA #3F ERROR
00660 BHI ERROR too high
00670 CMPA #3A too low
00680 BLO ERROR
00690 LBL20 convert $30-$3F to 0-$f
00700 STA <$30 (temporarily stored)
00710
00720 LDD number so far
00730 ASLB
00740 ROLA shift over
00750 (multiply by 16)
00760
00770 RDLA
00780 ROLA
00790 ROLA
00800 ROLA
00810 ADDB add latest digit
00820 ADCA #0
00830 STD <$2B save result
00840 JSR $9F another digit?
00850 BNE LBL10 yes...
00860
00870 LDD <$2B ... else get final result...
00880 RTS ... and return
00890
00900
0700 BD A928
0703 30 8D 0130
0707 80 26
0714 8D 24
0716 ED 8C 5E
0719 30 8D 014A
071D 8D 10
071F BD AF67
0722 DC 2B
0726 27 F3
0726 ED 8C 50
0729 20 53
072B AD 9F A002
072F A6 80
0731 26 F8
0733 BD A390
0736 9F A6
0736 OE 9F
073A 9E 8A
073C 9F 2B
073E 25 0A
0740 80 07
0742 81 3F
0744 22 1F
0746 81 3A
0748 25 1B
074A 80 30
074C 97 01
074E DC 2B
0750 58
0751 49
0752 58
0753 49
0754 58
0755 49
0756 58
0757 49
0758 DB 01
075A 89 00
075C DB 2B
075E 9D 9F
0760 26 DC
0762 DC 2B
0764 39
```

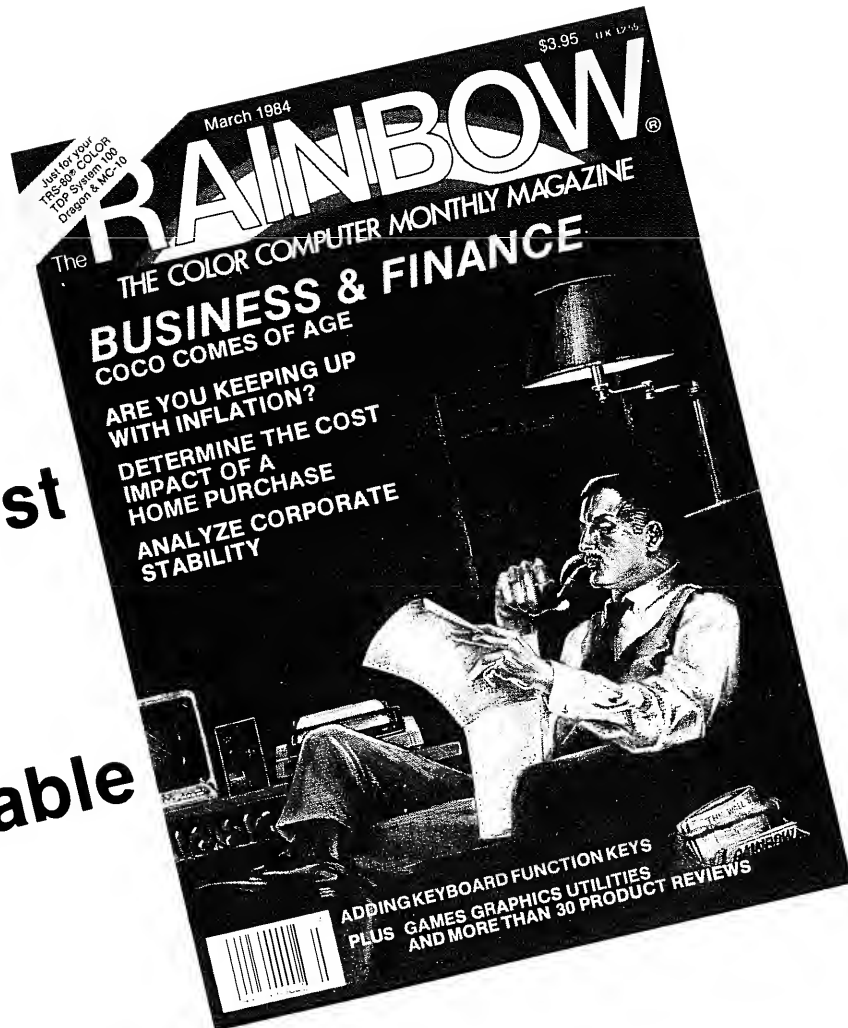
```

00910 *** Error routine for
00920 *** Incorrectly typed Hex
00930
0765 32 62 00940 ERROR LEAS 2,S 1-up return address
0767 30 80 0117 00950 LEAX ERWES,PCR point to error message
0768 46 94 00960 LOOP30 LDA X+ get next character
0769 27 94 00970 BGT START20 if done, try another round
076F AD 9F A002 00980 JSR [SA002] else print character
0773 20 F6 00990 BRA LOOP30 keep going
01000
01010
01020 * Variables stored here:
01030
01040 S1 RMB 2 start address of W/L block
01050 S2 RMB 2 end address of W/L block
01060 LN RMB 2 Basic line number to build on
01070 LOC RMB 2 points to start of Basic line
01080 CKSUM RMB 1 checksum forms here
01090
01100
01110 *** APPEND-DATA ***
01120 * (with a few changes)
01130
01140 GETDAT LEAS -1,S make room for temp storage
01150 LOY <S1,PCR Point Y to start of M/L
01160 LDD <LN,PCR starting line number
01170 JSR SADR01 find line in memory
01180 CLR <CKSUM,PCR
01190
01200 * Now X points to Basic,
01210 * Y points to M/L
01220
01230 NEWLN STX <LOC,PCR save address of current line
01240 LEAX 2,X move past line-link pointer
01250 LDD <LN,PCR get line number...
01260 STD X++ ... and store in BASIC line
01270 ADD0 #10 bump line number...
01280 STD <LN,PCR ... and save for next pass
01290 LDD #38620 "DATA" token, with space
01300 STD X++ to start of line
01310 CLR S #data this line = zero
01320 BRA NOCOM no comma first time through
01330
07A6 86 2C 01340 LOOP LDA #', ASCII comma...
07A8 A7 80 01350 STA X+ ... to BASIC memory
07AA 10AC 8C C9 01360 CMPY <S2,PCR block done?
07AE 2E 63 01370 BGT DONE if yes
07B0 A6 A0 01380 LOA Y+ next byte from M/L block
07B2 34 02 01390 PSHS A
07B4 AB 8C C6 01400 ADDA <CKSUM,PCR
07B7 A7 8C C3 01410 STA <CKSUM,PCR
07BA 35 02 01420 PULS A
07BC 80 10 01430 BSR CONVERT make ASCII and store in Basic
07BE 6C E4 01440 INC S count one more datum in line
07C0 86 07 01450 LDA #7 change to suit yourself
07C2 A1 E4 01460 CHPA S done this line?
07C4 26 E0 01470 BNE LOOP not yet
01480
01490 * Process end of Basic line
01500
01510 CLR X+ flag end of BASIC line
01520
01530 * X now points to next Basic line
01540
07C8 AF 9C B0 01550 STX <[LOC,PCR] link new line to last one
07CB 20 C0 01560 BRA NEWLN keep going
01570
01580 * Convert data in "A" register *
01600 * to 3-digit number and insert *
01610 * into Basic memory
01620
01630
07CD 01640 LZFLC RMB 1 flag for suppressed leading zero
01650
01660 * First, make 3-digit number
01670
01680 CONVRT LOU #55F2 video screen is temp workspace
07CE CE 05F2 01690 CLR X+ clear out three bytes
07D1 6F C4 01700 CLR -U decimal number forms here
07D3 6F C2 01710 CLR -U decimal number forms here
07D5 6F C2 01720 CLR -U decimal number forms here
07D7 6C C4 01730 INC U bump hundreds counter
07D9 80 6A 01740 SUBA #100 decrement number
07DB 24 FA 01750 BCC LOOP1 if not past zero
07DD 88 6A 01760 ADDA #100 too far: adjust
07DF 6A C0 01770 DEC U+ adjust counter and move up
07E1 6C C4 01780 LOOP2 INC U+ same for tens counter
07E3 80 0A 01790 SUBA #10
07E5 24 FA 01800 BCC LOOP2
07E7 8B 0A 01810 ADDA #10
07E9 6A C0 01820 DEC U+
07EB 6C C4 01830 LOOP3 INC U+ ... also for ones counter
07ED 80 01 01840 SUBA #1
07EF 24 FA 01850 BCC LOOP3
07F1 6A C4 01860 DEC U+
01870
01880 * Now insert into Basic program
01890
07F3 33 5E 01900 LEAU -2,U point to hundreds counter
07F5 C6 03 01910 LOB #3 three digits to show
07F7 6F 8C 03 01920 CLR <LZFLC,PCR leading zeros suppressed
01930
07FA A6 C0 01940 LDA U+ get number
07FC 60 8C CE 01950 TST <LZFLC,PCR leading zeros suppressed?
07FF 26 0A 01960 BNE PUTIF if not
0801 C5 02 01970 BTFB #2 last digit?
0803 27 06 01980 BEQ PUTIF if 40
02020
080B 8B 30 02030 PUTIF A00A #530 convert to ASCII
080D A7 80 02040 STA X+ and store in BASIC line
080F 5A DEC8 02050 NEXT done three digits?
0810 26 E8 02060 BNE LOOPA not yet
0812 39 02070 RTS
02080
02090
02100 ** DONE! **
02110 ** CLEAN UP AND GO HOME **
02120
02130 * Write Datum of 1000
02140
0813 CC 3130 02150 DONE LOD #3130 ASCII "10"
0816 E0 81 02160 STD X++ to BASIC line
0818 4A 02170 BECA ASCII "000"
0819 E0 81 02180 STO X++
02190
02200 * Write checksum
02210
081B 86 2C 02220 LOA #', one more comma
081D A7 80 02230 STA X+ to Basic program
081F A6 80 FF5A 02240 LOA CKSUM,PCR
0823 8D A9 02250 BSR CONVRT put checksum at end of program
02260
02270 * Flag End of Basic program
02280
0825 6F 80 02290 CLR X+ flag end of line
02300
0827 AF 90 FF50 02310 STX [LOC,PCR] link last line
082B 6F 80 02320 CLR X+ flag end of BASIC program
082D 6F 80 02330 CLR X+
082F 9F 1B 02340 STX <X+B end program pointer
0831 9F 1D 02350 STX <S1D end variables pointer
0833 9F 1F 02360 STX <S1F start free space pointer
0835 35 82 02370 PULS A,FC adjust stack and return

```



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		02380				0866	00	02480	FCB	0	
		02390				0867	0D	02490	LINENO	FCB	\$0D
		02400	** All messages start with <Enter>			0868	53	02500	FCC		/STARTING LINE# (DECIMAL)?/
		02410	** And end with Zero				54				
		02420					41				
0837	0D	02430	STAD	FCB	\$0D		52				
0838	53	02440		FCC	/STARTING ADDRESS (HEX)?/		54				
	54						49				
	41						4E				
	52						47				
	54						20				
	49						4C				
	4E						49				
	47						4E				
	20						45				
	41						23				
	44						20				
	44						28				
	52						44				
	45						45				
	53						43				
	53						49				
	20						4D				
	28						41				
	48						4C				
	45						29				
	58						3F				
	29						00	02510	FCB	0	
	3F						0D	02520	ERMES	FCB	\$0D
084F	0D	02450		FCB	0	0881	00	02530	FCC		/error/
0850	0D	02460	ENDAD	FCB	\$0D	0882	0D				
0851	45	02470		FCC	/ENDING ADDRESS (HEX)?/	0883	65				
	4E						72				
	44						72				
	49						6F				
	4E						72				
	47						00	02540	ZEND	FCB	0
	20						0700	02550	END		START
	41										
	44						00000	TOTAL	ERRORS		
	44						CKSUM	077D	LN	0779	NEXT 080F
	52						CONVRT	07CE	LOC	077B	NOCOM 07AA
	45						CVTHX	073A	LOOP	07A6	PUTIT 080B
	53						DONE	0813	LOOP1	07D7	PUTMES 072F
	53						ENDAD	0850	LOOP2	07E1	S1 0775
	20						ERMES	0882	LOOP20	072B	S2 0777
	28						ERROR	0765	LOOP3	07EB	STAD 0837
	48						GETDAT	077E	LOOP30	076B	START 0700
	45						LBL10	073E	LOOPA	07FA	START2 0703
	58						LBL20	074A	LZFLC	07CD	ZEND 0888
	29						LINE	0719	NEWLN	078D	
							LINENO	0867			

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**Fm: William Harris (to W. Day)**

Isn't smart enough? It also could be that he works a job during the day and doesn't have the time to put into a complete file system. I've written a chess program for the CoCo (which, unfortunately, is still not up to an adequate level of play, as far as I'm concerned), but right now, working 10 hour days, I haven't the time to improve its play, let alone fiddle with a disk opening book. If this makes me too unintelligent to write good software for the CoCo, so be it.

**Fm: Wayne Day (to W. Harris)**

Bill, Notice that in all of this discussion, I have tried to emphasize what I believe to be the differences in responsibilities of someone who writes software for himself, or a small circle of friends, or for something like the SIG, and the person who sets out to write something intended for commercial distribution.

The guy that writes it for himself should feel free to do anything that makes him comfortable.

The guy who's trying to sell it owes something to the purchasers of his software, something besides "Well, it works on *my* machine."

**Fm: William Harris (to W. Day)**

I agree with that. But—in my case, I started my program with the idea that if it never amounted to much, I wouldn't be too disappointed; and if it played like a champ, I'd try to sell it. Now are you saying that even though I started this as a personal project, I am forever more barred from selling the program? Of course not.

In my own case, the lack of disk I/O only deprives the program of a good, but not vitally necessary, feature. Indeed, if I were to take the route you are apparently suggesting (program for myself and my own personal group of acquaintances only) I could very easily solve the

problem of disk I/O by just storing my information on a data disk, completely bypassing the DOS directory scheme.

Unfortunately, I can see the dilemma of a professional programmer, who has an idea for an excellent graphics program. He sits down, sketches the program out, gets rudiments of it running—and then he reaches the decision about whether or not he should continue. The time and effort spent in writing a set of disk file handling routines for a program which will require many more months of work is likely to completely deter him from completing his program.

**Fm: Wayne Day (to W. Harris)**

Well, let me answer your question this way . . .

If you can reasonably assure yourself, and still be able to sleep at night, that your program will run properly on any three CoCos I choose (assuming, of

course, they have any special hardware that is needed, like a Workpak or RS-232 pak, or whatever special needs are built into the program), then I've got absolutely no problem with it.

My choices are:

1. "D" Board CoCo with 1.0 Basic, 1.0 Extended, and 1.0 Disk.
2. TDP-100 with 1.1 Basic, 1.0 Extended and 1.1 Disk.
3. CoCo-II (Vers. 3)—the new one Marty was telling us all about, with 1.3 Basic, 1.2 Extended and 1.3 Disk (or whatever it had in it).

The absolute main thing I'm trying to say in all of this is something on which a lot of folks seem to be missing the point. All I want is for programmers to be able to write their software so that it runs on *all Color Computers*, not just the one they have in their hands right now!!

The reason for that is that I want all CoCo owners to be able to purchase software and be reasonably sure it will work on their machines, not like a lot of programs.

Given your example, you've got everything except Disk I/O; then why not use the documented DSKCON call at \$C004?

Heck, though it's not exactly in the best of taste, a lot of folks just take the Shack's code for a particular needed operation and stuff it into their program, maybe changing it up or cleaning it up a bit to get around the legal points.

I really don't care *how* it's done . . . just that it does need to be done to ensure the integrity of the investment of those who have CoCo's now, and of those who will be getting them in the future.

**Fm: William Harris** (to W. Day)

Well, again, in my case it'd be easy to just stuff information onto the disk with DSKCON. (And if I should eventually build that into my program, it'd probably be the way I would have to go.) But while your sentiments are admirable, and I agree wholeheartedly with them in that programmers *should* write a program that'll run on everything, for any program that uses the disk and any programmer who lacks a couple of weeks (80 hours time, maybe?) to write disk routines, Tandy/Microsoft have made it fiendishly difficult.

My own program makes no undocumented calls (just CHROUT and POLCAT), and it has worked on all the CoCos I've been able to try it on.

**Fm: Wayne Day** (to W. Harris)

What, then, is the basis of the argument, William? In your example, it seems you've fulfilled what I think should be

done—you've used the documented calls. You've made it compatible.

If you're writing the program with the idea that you're gonna sell it, you owe it to the people who are going to buy the program to give them something they can use.

It may be time-intensive, true, but would *you* want to spend \$50 on some product only to find out it won't run on your machine, then be told that the warranty everyone uses says "sorry, it's as is where is"?

*(Two replies follow:)*

**Fm: A. Flexser** (to W. Day)

Wayne, where are all these programs you keep complaining won't run on all ROM versions? The only ones I've run into that fit into that category (commercial programs, I'm talking about) are old programs that came out *prior* to the new

---

"I really don't care *how* it's done . . . to ensure the integrity of the investment . . ."

---

ROM versions, and, if they are still around, now exist in version that run on the new ROMs as well as the old. I agree entirely that it would be utterly reprehensible for anyone to be currently selling a program that doesn't run on all current and past ROMs, but I know of absolutely no case where anyone is actually doing this. Have you actually run into any cases of what you're deploring?

*(The reply series immediately following, marked by \*, relates to this first reply:)*

**\*Fm: Wayne Day** (to A. Flexser)

The old Telewriter is on the top of the list, Art. But, no, since I have the old ROMs, in both my machines, I don't have any problems . . . just responding to the original question about compatibility.

**\*Fm: A. Flexser** (to W. Day)

But the old Telewriter was updated very quickly as soon as the new ROMs appeared, along with virtually everything else that needed an update. And it does a version check just like Vidtex, and uses one of two direct calls now depen-

ding on version. So, if Vidtex meets your criteria, I don't see who *doesn't*.

**\*Fm: Wayne Day** (to A. Flexser)

That just goes to show you, thank goodness, that most of the folks selling programs agree with me, then. You got to make some provision for remaining compatible with the rest of the world!

**Fm: William Harris** (to W. Day)

Hark back a couple of messages. In my particular case, the lack of meaningful disk I/O (meaningful defined as Radio Shack DOS compatible—not just stuffing data onto the disk in some arbitrary manner that only my program can understand) is only a minor flaw. In my case, unless I do some kind of copying from Radio Shack ROM or DOS, or unless I do some undocumented calls to ROM, my program will never have disk I/O. I just don't have the time to fool around with it. But in an application that requires disk I/O, the argument still remains: Radio Shack has put up a significant barrier (involving *anyone*, expert of novice) that will quite likely prevent many a good programmer from writing and carrying through to market a program that needs to access the disk.

*(Two replies follow:)*

**Fm: Wayne Day** (to W. Harris)

I agree with that, William . . . just saying that there are ways around the Shack's barrier, and that commercial programs *need* to find some way around them.

**Fm: Paul Hoffman** (to W. Harris)

Bill, I know for a fact that if you don't want to write your own DOS, Peter Stark (of Star-Kits) will license the use of "Star-DOS" for any commercial applications. He tells me that there are programs out there using it. And the licensee only pays for the portions he needs in the particular application.

**Fm: William Harris** (to P. Hoffman)

License Star-DOS from a company that has publicly stated that it wants nothing more to do with the CoCo market? (See STAR.KIT in XA0.)

Furthermore, when's the last time you saw a product advertised that uses Star-DOS? I myself can only vaguely remember Starkits' advertisements about Star—DOS.

**Fm: William Harris** (to Marty)

Not to mention the fact that only checking for version numbers can *also* be a

lazy programming technique, compared to writing a complete file handling system!

**Fm: Marty** (to W. Harris)

As Sandy Trevor and I were discussing in an earlier thread, there is a middle ground between writing your own DOS from scratch and merely checking the version numbers. One is to check version number by looking at the DSKCON vector. This of course has potential problems if a new version disk ROM comes out that has the same DSKCON location but different locations of the file handling routines. A slightly more complex approach is to look for the two- and four-byte sequence of the entry point to the undocumented routine you seek to use. Most often when they alter the ROM the code for the beginning of a given routine is not altered. This technique has a lot of potential for making a program that uses the undocumented routines compatible with future generation ROMs. It's not foolproof, of course, but it does have a lot going for it.

What do you think of that idea... William? Sandy?

**Fm: William Harris** (to Marty)

I think that it's still going through a lot of wasted effort. But, wasted effort is better than no effort at all, and this scheme is the best one that doesn't flat-out require authorship of another DOS.

I believe your suggestion that even at this late date Tandy include thoroughly documented routines is the best idea yet. This would indeed have the advantage of fixing in concrete any and all checks for old DOS's entry points, as well as giving future authors something

they can aim at.

I would also suggest that their next DOS be *finally* debugged. Some of their bugs (PCLEAR, although it's not a DOS bug, is the most (in)famous one! But the Close bug, the Field bug, and others can easily be called to mind) should have been caught even during the simplest of testing procedures. It makes me believe that whoever was responsible for the Basic, both at Tandy and Microsoft, didn't run it through much serious testing.

Despite my jumping on Radio Shack's case, however, I would like to say that their Basic and DOS, while buggy, are infinitely preferable to Apple DOS 3.3! While we CoCo owners gripe and stew about *our* bugs, you should see what *they* have to put up with! (continued).

**Fm: Roger Bouchard** (to W. Harris)

The 'Field' bug? A new one for me. Can you please elaborate, as I use that command a lot in my graphic editor programs. (See, at least one person reads every word you write!)

**Fm: William Harris** (to R. Bouchard)

The condition occurs when you are manipulating multiple file buffers. Open 1, Field 1, Open 2, Field 2, (do some stuff), Close 2, LSET (a field from 1) = ?SE Error. Apparently the closing of file 2 makes it forget not only the buffer two fields, but also the buffer one fields.

**Fm: Roger Bouchard** (to W. Harris)

I see. Thanks for the info. Personally, I might not have to worry since I usually close everything at once when I'm finished. (end)

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# Things You Ought To Know . . .



## Disk Punch

By Mark Haverstock

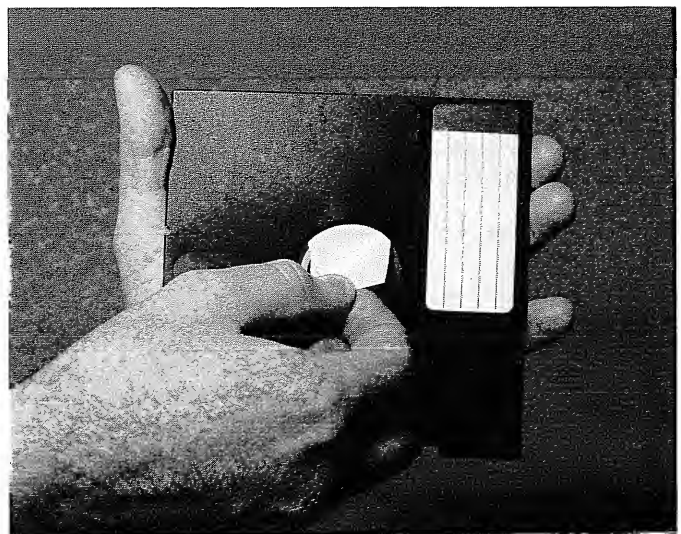
Using the *other side* of a disk is a time-honored method passed down from veteran computer users to novices. This article is for those who have been too timid to try.

A disk is a thin circular piece of mylar coated with magnetic material on both sides. They are available in single, double, and quad density ratings, single- or double-sided. The Color disk system specifies single-sided, double-density (SSDD). The manufacturer verifies an SSDD can read and write on one side of the disk at the stated double density. They make no claims or guarantees as to the fitness of the other side. Experience, however, shows 95 to 100 percent success in using the other side.

OK. Now go get: 1 paper punch; 1 1 x 3 inch piece of waxed paper or backing sheet from tractor feed labels; scissors, and rubber cement. Copy the template (Fig. 1). Mount it on a sturdy surface, such as posterboard. Punch out the index hole and write protect notches on your template. Match your template with a disk to be sure the holes are properly aligned.

Using a blank unformatted disk, line up the disk and template with the write protect notches opposite each other (Fig. 2). Carefully trace the index hole and notch onto the disk in pencil; turn the disk over and repeat.

Punch out the write protect notch on your disk first. The index holes are slightly more difficult, take care not to damage the magnetic surface of the disk. Use your thumb to lift up the black shell of the disk near the center hub. Insert the 1 inch wide piece of waxed paper or label backing to protect the disk surface (see photo). Carefully insert the paper punch and punch the index hole position marked on the cover of the disk (photo). Repeat this procedure on the other side.



Photos Thanks to Frank Lazzari

Photo 1. Insert Wax Paper

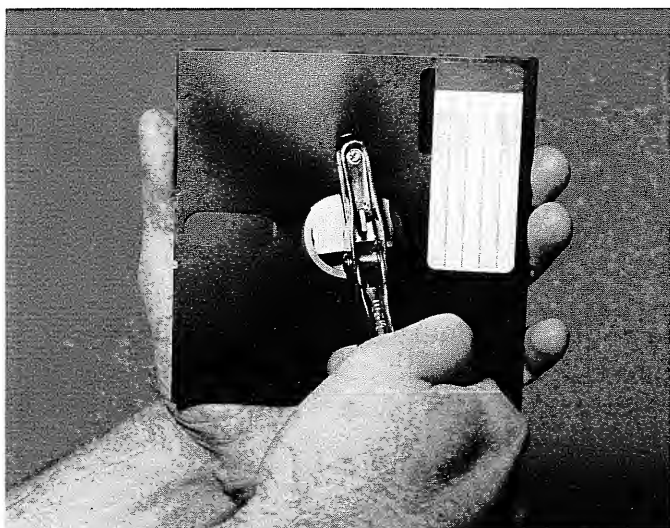


Photo 2. Punch Hole

Next, examine the disk. The write protect notches and index holes should be fairly symmetrical.

Try formatting the new side of the disk using DSKINI. If all has gone well, the ok prompt will appear.

If you weren't so lucky: *WP error* indicates that the write protect notch wasn't aligned properly. Widen the hole slightly with the paper punch and try again.

*I/O error* will probably mean that the index holes on the front and back aren't lined up properly. Check this by slowly rotating the disk until the index hole on the disk shows through. If it doesn't show through clearly, widen the offending hole in the outside cover slightly. Then try to format it again; if it still gives an I/O error, put a write protect notch on the second side. Unless you have a disk utility capable of "locking out" bad sectors, don't bother trying to use the *other side*.

One further characteristic of the disk: the white media inside the disk lubricates and cleans the diskette. Foreign matter is trapped on its surface. When the disk is used on the *other side*, the reverse process happens. If you keep your disks in a clean environment, this will be of little concern. Users who subject their disks to cigarette smoke, dust, dirt or excessive use may want to reconsider, or clean up their act. (end)



Photo 3. Finished Other Side

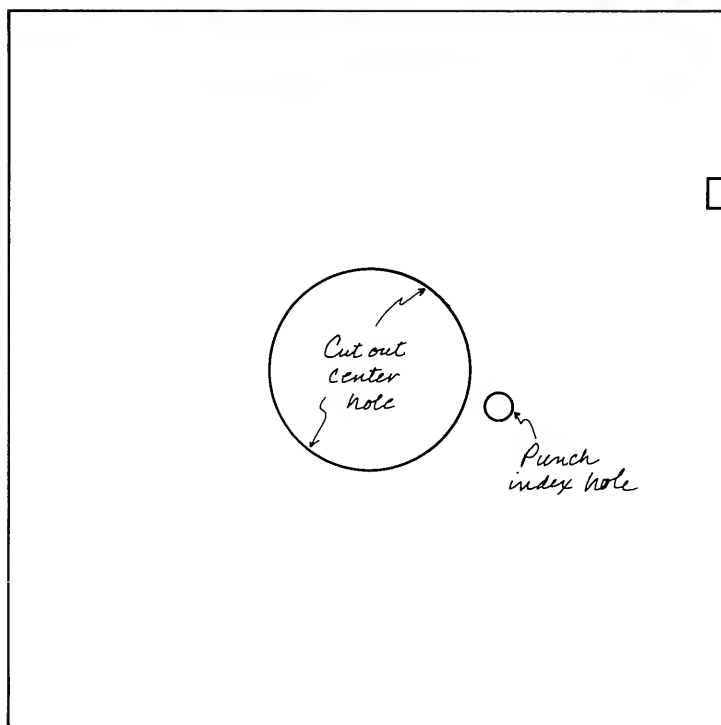


Figure 1. Template

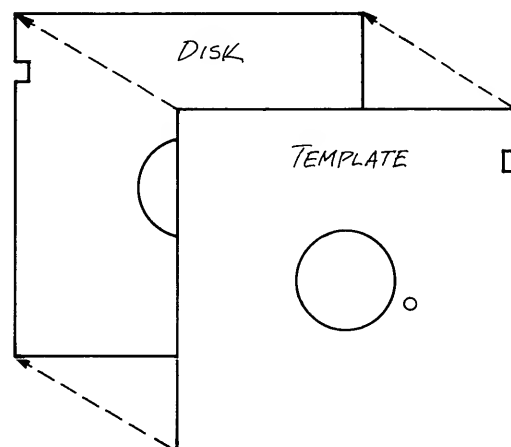
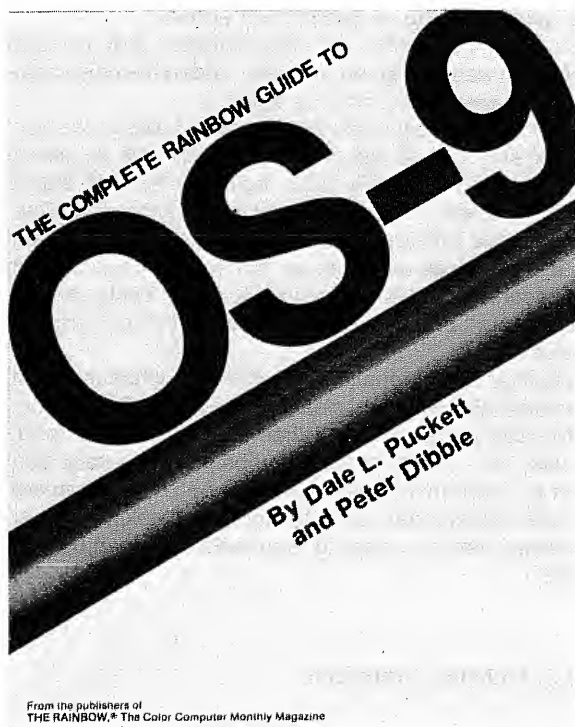


Figure 2. Line-Up

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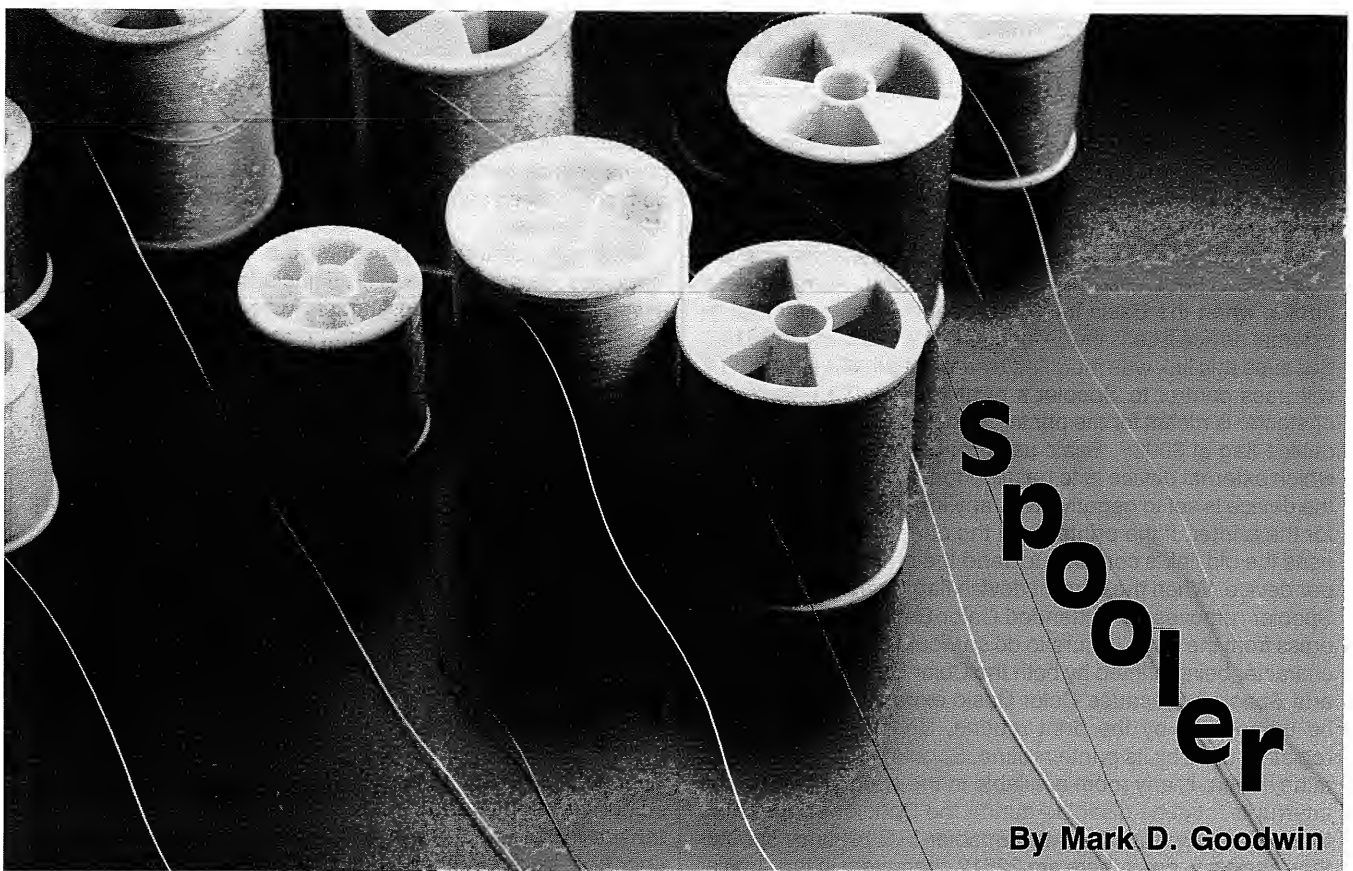
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By Mark D. Goodwin

Except for a few that operate at extremely high speeds, printers are usually the slowest link in the data processing chain. While waiting for a printer, most computers are unable to perform other tasks. When placed between the computer and the printer, a printer spooler will appear to be a printer to the computer. Whenever printer operations are needed, the computer sends all printer data to the spooler. On receipt of the printer data, the spooler checks the printer status. If the printer is ready to accept data, the spooler sends the data on to the printer. Because the computer and the spooler are many times faster than the printer, this direct transfer of data will continue only for a short time. When the printer is no longer to accept data from the spooler, the spooler automatically buffers any new printer data into an internal memory buffer. When the printer is able to accept more data, the spooler sends the buffered data to the printer. If the spooler's buffer should become empty, the spooler once again transfers any new printer data directly.

The large internal memory buffers of most printer spoolers let the computer free itself for other tasks. Most printer spoolers are fairly expensive and will often cost as much or more than the computer itself. This is particularly true of an inexpensive computer like the Color Computer.

After checking the cost of printer spoolers, and finding out just how expensive they are, I decided I could live without one. Then I upgraded to 64K. With that addition, I wondered if I could put the extra 32K of RAM to use as a spooler buffer. After some experimentation, I produced the assembly language program which appears as Listing 1. By using bank selection and a primitive multitasking system, Spooler effectively simulates a printer spooler. Besides spooling printer data, Spooler can send data to the printer at any one of 15 different bauds. These bauds range from an excruciatingly slow 50 baud to a lightning fast 9600 baud.

Once Spooler is placed in protected high memory, the initialization routine (lines 300-590 of Listing 1) is used to link

Spooler with the Color Basic interpreter. This routine first disables the Color Computer's interrupts. Spooler uses the Color interrupt system to perform a primitive multitasking operation. After disabling the interrupts, the initialization routine performs a 64K memory check, by switching the upper 32K RAM bank into system memory. With the 32K bank switched in, Spooler loads the 32K bank's first byte into accumulator A. This upper 32K RAM byte is inverted and resaved in the 32K bank. By subtracting the new contents of the upper 32K bank's first byte from the accumulator, Spooler can determine if the Color Computer has 64K of RAM available. If so, the accumulator will hold a non-zero result. With the memory check completed, the initialization routine switches the Color Basic ROMs back into the system. Then the initialization routine aborts if the upper 32K bank wasn't found. Otherwise, the initialization routine sets a flag indicating a successful memory check.

After completing a successful memory check, the initialization routine sets the links with the Color Basic interpreter. To operate successfully, Spooler must be linked with Color Basic in two ways: to alert Spooler when a character is being sent to the printer, Spooler uses the Extended Color Basic link located at \$0167. This Extended Color Basic link is called whenever a character is sent to an external device. The initialization routine saves the contents of the link and saves a jump to Spooler's print routine (lines 700-1020 of Listing 1) as the link's new contents. Second, Spooler must be able to send buffered characters to the printer without interfering with normal Color Basic operations. This multitasking operation is accomplished by using the normal interrupt (IRQ) vector at \$010C. The Color Computer's 6809 microprocessor performs a jump to the IRQ vector whenever an IRQ interrupt occurs. Under normal operation the Color Computer generates an IRQ interrupt 60 times a second. By linking with the IRQ vector, Spooler can send buffered characters to the printer at this rate. Spooler saves the contents of the IRQ vec-

tor and saves a jump to Spooler's IRQ routine (lines 1060-1630 of Listing 1) as the vector's new contents. With the two Color Basic links established, the initialization routine enables the interrupts and returns to the Basic interpreter.

Spooler then performs its function in two separate phases. The first phase is the print character phase. As mentioned above, when the Basic interpreter sends a character to an external device it calls the Extended Color Basic link at \$0167. Because this link was modified by the initialization routine, it will pass control to Spooler's print routine. To ensure the character is meant for the printer, Spooler examines the Basic device flag at \$006F. Basic uses the device flag to indicate which external device is to be used for input or output. When the device is set to negative two, any input or output is meant for the printer. If the printer isn't the current device, Spooler uses the old link's contents to send the character to the proper device. When the current device flag is set for the printer, Spooler removes the Extended Color Basic link's return address from the stack (failure to do so would result in the printer character being printed by both the Color Basic printer routine and Spooler). Because Color Basic expects all registers to be unmodified by the print routine, Spooler saves all the registers used by its print routine. Spooler must then determine if there is any room available in the spooler buffer. The interrupts must be disabled during the Spooler print routine to avoid interference from the Spooler IRQ routine. Spooler then checks to see if there are 32512 characters in the spooler buffer, a full buffer. If so, Spooler must enter a looping phase until the IRQ routine sends at least one character to the printer. Because Spooler has disabled the interrupts, Spooler's IRQ routine is turned off. Spooler enables the interrupts and waits for one interrupt before looping back to the buffer check routine. When there is enough room available in the spooler buffer, Spooler updates and saves the number of buffered characters counter, retrieves the next buffer location pointer, switches the RAM bank into system memory, saves the printer character in the RAM buffer, switches the ROMs back into system memory, updates and saves the next buffer location pointer, updates the Color Basic line position, restores the registers, and returns to the calling routine.

When characters are in the spooler buffer, Spooler needs a way to send them to the printer. Spooler performs this phase of its operation via the IRQ routine. When the 6809 microprocessor detects an IRQ a jump is made to the IRQ vector at \$010C. Because the initialization routine has modified the IRQ vector's contents, all jumps to the IRQ vector will in turn pass control to the Spooler's IRQ routine. This IRQ routine checks to see if Spooler has been turned off. If so, the IRQ routine passes control to the Basic interpreter's IRQ routine. Next, the IRQ routine checks to see if the printer is ready to accept data. The printer status check is performed by examining bit 0 of address \$FF22. If this bit is set to a logic one, the printer isn't ready and the IRQ routine passes control to the Basic interpreter's IRQ routine. If the printer is ready, the IRQ routine must check for buffered characters. Spooler's print routine maintains a count of the number of buffered characters; therefore, the IRQ needs only examine this counter for buffered characters. If there is at least one buffered character, the IRQ routine saves an updated number of characters counter, retrieves the current character pointer, switches the RAM bank into system memory, recovers a character from the RAM bank, switches the ROMs back into

system memory, updates and saves the current character pointer, sends the character out the Color Computer's RS-232 port, and passed control to the Basic interpreter's IRQ routine.

### Using Spooler

Although Listing 1 presents the complete assembly language details of Spooler, I included it only to assist assembly language programmers who may wish to modify Spooler for use in their own programs. To use Spooler with any version of Basic, Listing 2 is a Basic POKE version of Spooler. This version will automatically execute Spooler without the bother associated with loading and executing an assemble language program.

Be sure to save a few copies of Spooler before trying it out; the Basic program automatically erases itself from memory via the new command in line 1610.

With copies of Spooler saved on tape or disk, simply type RUN and Enter to execute the program. Spooler starts by reserving high memory and POKEing the assembly language program into the reserved memory area. Spooler then calls the initialization routine. Spooler will determine if the initialization was successful; if it failed, Spooler will display an appropriate error message. With a successful initialization completed, Spooler will prompt you for the baud. To make Spooler's multitasking operation as transparent as possible, select the highest baud your printer or serial-to-parallel interface is able to operate with. If a change in baud should ever be desired, a change can be accomplished by POKEing the appropriate baud code into memory location 149 (\$0095). The baud codes used by Spooler are illustrated in Table 1.

Table 1. Baud Codes

Baud	Code (Stored at location 149)
500	
75	1
110	2
135	3
150	4
300	5
600	6
1200	7
1800	8
2000	9
2400	10
3600	11
4800	12
7200	13
9600	14

Because I wanted the ability to reset the spooler and turn it on or off from a Basic program, I incorporated these abilities into the spooler program. Listing 3 presents the code to turn the spooler off. Listing 4 is the code to turn the spooler on. Finally, Listing 5 presents the code for resetting the spooler. All three programs are short and can be easily incorporated into a Basic program; these operations can be performed at the Basic command mode level by simply entering the code with a line number.

A word of caution is in order about these three short programs. To operate correctly, all three expect the Spooler program to be located directly above the Basic high memory pointer. Therefore, always load other high memory routines before running the Basic POKE version of Spooler. Failure to do so will not affect Spooler's operation, but the three utility programs will not function correctly.



# Listing 1. Spooler

```

00100 *
00110 * 64K CoCo Printer Spooler 1.0.0
00120 * Copyright (c) 1984 By Mark D. Goodwin
00130 *
00140 BAUD EQU $0095
00150 DEVICE EQU $006F
00160 IRQVEC EQU $010C
00170 LFOS EQU $009C
00180 MFOS EQU $009B
00190 OUTVEC EQU $0167
00200 SRAM EQU $FFDF
00210 SROM EQU $FFDE
00220 ORG $7EBF
00230 *
00240 * Initialization Flag
00250 *
00260 IFLG FCB 0
00270 *
00280 * Initialization Routine
00290 *
00300 INIT ORCC $50 Disable the interrupts
00310 STA SRAM Select RAM bank
00320 LDA $8000 A=RAM byte
00330 COMA Invert it
00340 STA $8000 RAM bank
00350 SUBA $8000 available?
00360 STA SROM Select ROM bank
00370 BNE INIT0 Jump if not 64K CoCo
00380 DEC IFLG,PCR Flag 64K CoCo
00390 LDU $OUTVEC Save the old
00400 LEAX $OUT,PCR output character
00410 BSR INIT1 routine's address
00420 LDU $IRQVEC Save the
00430 LEAX $IRQ,PCR old IRQ
00440 BSR INIT1 routine's address
00450 LDA $7E Set
00460 STA OUTVEC the new
00470 STA IRQVEC routines'
00480 LEAX $PRINT,PCR addresses
00490 STX $OUTVEC+1
00500 LEAX $IRQ,PCR
00510 STX $IRQVEC+1
00520 INIT0 ANDCC $AF Enable the interrupts
00530 RTS Return to Basic
00540 INIT1 #3 B=Loop count
00550 INIT2 LDA $U+ Save
00560 STA $X+ a byte
00570 DEC $DECB Loop
00580 BNE $BNE till done
00590 RTS Return
00600 * Spooler Variables and Pointers
00620 *
00630 SFLG FCB 0
00640 SLEN FCB 0
00650 CPTR FCB $8000
00660 NPTR FCB $8000
00670 *
00680 * New Output Character Routine
00690 *
00700 FRINT B Save B
00710 LDB DEVIC Is the device
00720 CNFB #-2 the printer?
00730 PULS B Get B

```

Coming  
in next issue  
what  
we have all  
been  
waiting for  
  
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## Listing 2. Basic Version

```

0 '
1 ' 64K COCO SPOOLER 1.0.0
2 ' BASIC POKE VERSION
3 ' COPYRIGHT (C) 1984 BY MARK D. GOODWIN
4 '
5 ' SET UP THE DISPLAY
6 '
10 CLS
20 PRINT"      64K COCO SPOOLER 1.0.0"
30 PRINT" COPYRIGHT 1984 BY MARK GOODWIN"
40 PRINT"-----"
50 PRINT"      PLEASE"
60 PRINT"      WAIT"
70 PRINT"      FOR ME"
80 PRINT"      TO"
90 PRINT"      INITIALIZATION"
100 PRINT"      THE SPOOLER"
197 '
198 ' RESERVE HIGH MEMORY
199 '
200 CLEAR200,PEEK(39)*256+PEEK(40)-320
297 '
298 ' POKE THE SPOOLER INTO HIGH MEMORY
299 '
300 M=PEEK(39)*256+PEEK(40)+1
310 FORI=0TO320:READJ:POKEM+I,J:NEXTI
397 '
398 ' CALL THE INITIALIZATION ROUTINE
399 '
400 EXECM+1
497 '
498 ' CLEAR PARTIAL SCREEN
499 '
500 PRINT@128,,:FORI=1TO6:PRINT:NEXT:PRINT@128,;
597 '
598 ' BRANCH IF 64K MACHINE
599 '
600 IFPEEK(M)<>0THEN900
697 '
698 ' DISPLAY ABORT MESSAGE
699 '
700 PRINT"      UPPER RAM BANK"
710 PRINT"      ISN'T AVAILABLE!"
720 PRINT
730 PRINT"      INITIALIZATION"
740 PRINT"      HAS BEEN ABORTED"
797 '
798 ' RESTORE HIGH MEMORY
799 '
800 CLEAR200,PEEK(39)*256+PEEK(40)+322
810 GOTO1600
897 '
898 ' SET UP BAUD RATES ARRAY
899 '
900 DIMB(14):FORI=0TO14:READB(I):NEXT
997 '
998 ' DISPLAY THE BAUD RATES
999 '
1000 FORI=0TO7:PRINT"      ";;IFB(I)<100THENPRINT"      ";
      ELSEIFB(I)<1000THENPRINT"      ";
1010 PRINTB(I):;IFI+8=15THENPRINTELSEPRINT"      "
      B(I+8)
1020 NEXT
1097 '
1098 ' GET THE BAUD RATE
1099 '
1100 PRINT@416,CHR$(13);:PRINT@416,;:INPUT" ENTER
      THE BAUD RATE";B
1197 '
1198 ' IS IT A LEGITIMATE RATE?
1199 '

```

```

1200 L=0:H=14
1210 M=(H+L)/2
1220 IFB(M)=B THEN1300
1230 IFB<B(M) THENH=M-1ELSEL=M+1
1240 IFL<=H THEN1210ELSE1100
1297 '
1298 ' SET THE BAUD RATE
1299 '
1300 POKE149,M
1397 '
1398 ' REMOVE INITIALIZATION ROUTINE
1399 '
1400 CLEAR200,PEEK(39)*256+PEEK(40)+78
1497 '
1498 ' DISPLAY COMPLETION MESSAGE
1499 '
1500 PRINT@128,,:FORI=1TO10:PRINT:NEXT:PRINT@128,;
1510 PRINT"      INITIALIZATION"
1520 PRINT"      IS COMPLETE!"
1597 '
1598 ' ERASE THIS PROGRAM
1599 '
1600 PRINT
1610 NEW
1697 '
1698 ' SPOOLER POKE VALUES
1699 '
1700 DATA0,26,80,183,255,223,182,128
1701 DATA0,67,183,128,0,176,128,0
1702 DATA183,255,222,38,43,106,140,232
1703 DATA206,1,103,48,141,0,63,141
1704 DATA34,206,1,12,48,141,0,211
1705 DATA141,25,134,126,183,1,103,183
1706 DATA1,12,48,141,0,30,191,1
1707 DATA104,48,141,0,98,191,1,13
1708 DATA28,175,57,198,3,166,192,167
1709 DATA128,90,38,249,57,0,0,0
1710 DATA128,0,128,0,52,4,214,111
1711 DATA193,254,53,4,39,3,61,162
1712 DATA30,50,98,52,19,26,80,174
1713 DATA140,228,140,127,0,38,5,28
1714 DATA175,19,32,241,48,1,175,140
1715 DATA213,174,140,214,183,255,223,167
1716 DATA128,183,255,222,140,255,0,38
1717 DATA3,142,128,0,175,140,195,129
1718 DATA13,39,8,12,156,150,156,145
1719 DATA155,38,2,15,156,53,147,109
1720 DATA140,171,38,87,182,255,34,68
1721 DATA37,81,174,140,161,39,76,48
1722 DATA31,175,140,154,174,140,153,183
1723 DATA255,223,166,128,183,255,222,140
1724 DATA255,0,38,3,142,128,0,175
1725 DATA140,134,48,141,0,70,214,149
1726 DATA58,58,58,230,128,231,141,0
1727 DATA46,174,132,175,141,0,37,141
1728 DATA29,95,141,28,33,254,33,254
1729 DATA33,254,198,8,52,4,95,68
1730 DATA89,88,141,12,53,4,90,38
1731 DATA243,141,3,255,0,255,198,2
1732 DATA247,255,32,142,0,0,198,0
1733 DATA38,5,48,31,38,252,57,90
1734 DATA18,38,252,57,0,8,183,0
1735 DATA5,205,0,3,242,0,3,57
1736 DATA0,2,227,0,1,110,0,0
1737 DATA180,99,0,0,63,0,0,56
1738 DATA0,0,46,0,0,28,0,0
1739 DATA0,0,17,0,0,9,6,0
1740 DATA0
1797 '
1798 ' BAUD RATE VALUES
1799 '
1800 DATA 50,75,110,135,150,300,600,1200,1800,
      2000,2400,3600,4800,7200,9600

```

## Listing 3. Turn Off

```

0 '
1 ' TURN SPOOLER ON
CODE
2 '
10
POKEPEEK(39)*256+PEEK(
40)*1,0

```

## Listing 4. Turn On

```

0 '
1 ' TURN SPOOLER OFF
CODE
2 '
10
POKEPEEK(39)*256+PEEK(
40)*1,1

```

## Listing 5. Reset

```

0 '
1 ' RESET SPOOLER CODE
2 '
10
M$PEEK(39)*256+PEEK(40)*
1:POKEM,1:POKEM$1,0:PO-
KEM$2,0:POKEM$3,128:PO-
KEM$4,0:POKEM$5,128:PO-
KEM$6,0:POKEM,0

```

\*\*\*\*\*  
\*\*\* NEWS FROM UNDER COLOR \*\*\* NEWS FOR UNDER THE COLORS \*\*\*  
\*\*\*\*\* Compiled May 23, 1985 \*\*\*\*\*  
\*\* Send news to: Under Color, Box 6809, Roxbury, VT 05669 \*\*  
\*\*\*\*\* CompuServe 70136,1257 \*\*\*\*\*  
\*\*\*\*\*

WHERE HAVE WE BEEN? At Rainbowfest and other places. Trying to meet our every-two-weeks schedule has been tough, especially with summer travel. Our apologies. WE'LL TRY TO DO BETTER. More Rainbowfest info will be printed next time.

\* \* \* \* \*

TSK, TSK DEPARTMENT: Colorware is UPSET WITH UNDER COLOR for publishing the integrated circuit types used in its COCOMAX CARTRIDGE (see Issue #6). It seems they're outraged that we've VIOLATED THEIR RIGHTS and HURT THEIR BUSINESS. Well, UNDER COLOR is outraged that companies still keep HIDING FROM THEIR OWN CUSTOMERS, and business at Rainbowfest was brisk, hardly hurting at all. Nevertheless, Under Color has asked Colorware to COME OUT FIGHTING if they think they're right ... and we're OFFERING SPACE right in these pages. So far? SILENCE. Perhaps Under Color is right in calling HARDWARE AND SOFTWARE PROTECTION TOTALLY INDEFENSIBLE. Well, Colorware? Can you defend it?

\* \* \* \* \*

A curious letter has been published recently in other CoCo mags about the 6847-T1 LOWERCASE VIDEO GENERATOR in the new Korean Color Computers. The letter states the -T1 is a pin-compatible, drop-in replacement for your present 6847. IT ISN'T ... DON'T TRY IT (that's why we didn't publish that letter!). By the way, want to know if you've got the new lowercase generator in your machine? Look for an integrated circuit with TANDY'S CUSTOM NUMBER XC80652P. (Read on for other KoKo changes). Under Color has a "Rev B" machine IN ITS HANDS NOW, and will report soon.

\* \* \* \* \*

WANT FULL DATA ON THAT 6847-T1 LOWERCASE VDG? Write to Motorola Semiconductors, 3501 Ed Bluestein Blvd., Austin TX 78721 and ask for PUBLICATION #ADI 1048 for product type MC6847T1. It's called "Advance Information", and IT'S FREE.

\* \* \* \* \*

In a BADLY SHRINKING COCO MARKET, many companies are ABANDONING THE BABY of the Tandy line. Under Color spoke to two firms soon to be DROPPING COCO SUPPORT, and it's certain that RGS MICRO IS OUT OF THE SELLING BUSINESS too. Under Color received a form letter from RGS indicating that they are KEEPING THEIR RESEARCH AND DEVELOPMENT department, but scuttling the rest. Where does this leave RGS customers? We'll report if there is anything to worry about. SKYLINE MARKETING has disappeared and its stock is being closed out by another company.

\* \* \* \* \*

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*****
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```

HARD DISK FANS -- especially those worried about the retreat of RGS Micro -- may be in for relief from P.R.O. Systems of Kansas City. Their new, FULLY SUPPORTED HARD DISK SUB-SYSTEM is about to be introduced, and was seen at Rainbowfest. The brainchild of the well-respected Steve Odneal, the first units survived their ordeal as airline baggage and performed flawlessly.

\* \* \* \* \*

PORTABLE COCO APPEARS! Again thanks to Steve Odneal, veteran improver and first with a CoCo-based Flex operating system, there has appeared a FULLY PORTABLE COLOR COMPUTER COMPLETE WITH DISK DRIVES AND MONITOR. The portable was on view at the May 17-19 Rainbowfest in Chicago, but it's ONLY A PROTOTYPE at this stage. Odneal will judge user interest from the show.

\* \* \* \* \*

WHAT?? A COCO KIT?? Radio Shack rumors continue, and the latest development involves a CoCo2 in kit form. News is sketchy at this point, but certain ELECTRONIC DROPPINGS LEFT IN A TANDY GARBAGE BIN suggest a CoCo kit is coming.

\* \* \* \* \*

Looking for SERVICE MANUALS? Many manuals can be ordered from Radio Shack National Parts by using an "MS" prefix. Korean KoKo 26-3134A is MS2603134A, for example. Try it. Speaking of service, among the MINOR CHANGES in the "A" KoKos is the use of a processor marked MX5560, which is a Motorola 6809EP, a Hitachi 6809EP or 68A09EP. Color Basic is TC1001 and Extended Basic is TC1002; unknown ROM TC1004 is also marked. Diodes previously used with IC7 (the SALT) are internal to the part after date code 8417 (17th week of 1984).

\* \* \* \* \*

It's CHECKSUM TIME. Here's an update of the checksums for the various versions of the Basic and Extended Basic ROMs:

Color Basic 1.0 ... 9505	Color Basic 1.1 ... E54B
Color Basic 1.2 ... 5917	Color Basic 1.3 ... 5342
Extended Basic 1.0 ... 2206	Extended Basic 1.1 ... 3338
Extended Basic 1.1 ... 9906 (some versions give this one!)	

Know the DISK BASIC checksums for various versions and alternate DOSes? Under Color would like to publish them here.

\* \* \* \* \*



# Off Color: Off Color: Off Color: When In Doubt, Try Prayer

By Jeffrey S. Parker

So, someone finally went and did it. They manufactured a device which can make my CoCo run CP/M. And (will wonders never cease?) my editor wants me to review it. I can just imagine it now—Little H's for ladders being run up and down by the letter "p," while X's try madly to capture them.

It arrives a few days later—with the COD label crimsoning at me (who says reviewers get the best software free?). Plugging it in is no problem; it goes into the cartridge port with only a minimum of force. It doesn't break, so we are off to a good start. On goes the disk drive controller, and my CoCo now looks as if it has hit a tree and broken off a stub wing attempting to land.

Okay, Wordstar 2.2—here we go! Whirrah, whirrah, chunk, kachunk, kachunkachunk, datippidah, datippidah . . .

There is the cursor: flashing from the middle of the screen (which is now black and white). No Wordstar. Not even a 1.1 version. A large tear forms in my right eye and courses down my cheek.

This is not an uncommon event. Someone claims to have developed the ultimate, and sends it out for review. "Sounds interesting," I remember saying to my Editor, "send it right along." And he does, with a note saying, "I need this desperately in three days or less. Help me, Computer Reviewer, you're my only hope." The image of the note fades, and I realize that the program does not work. Of course, it is not the manufacturer's fault. Lesson number 1 from computer reviewer school: the manufacturer is always right.

Then I go to do a little word processing, and the computer is now functionless. Motionless. Dark, silent, and depressing. I guess it is just a law of the Universe that my computer must break at the crucial moment. The CPU goes "phut," and that's that. Gonzo, kablooeie, out to lunch. And the review due in the morning. My IBM Selectric will have nothing to do with me. "You wanted word processing," it smirks at me, "you got word processing."

My wife walks in and sees my face. Whoosh, she's gone. Moments later, she returns with a blanket, a pillow, my slippers, a cold compress, and a hot toddy . . .

"It crashed," I whisper.

"There, there, dear. I am sure your CoCo will feel better soon. Now just relax, and I'll get you something yummy to eat." She knows the storm is brewing. She can feel the ozone in the air. She knows it will break at any second.

"What kind of machine . . ."

She groans, covering her eyes.

"Do they think they can hype on the American public . . ."  
Oh God . . .

"With this outrageous pricetag attached . . ."

She cranes her neck wildly, searching for cover.

"And the damn thing doesn't even run!"

My wife has always been inventive and decisive, particularly in crisis situations. She walks over and kicks la machine, and whirrah, whirrah, datippidah, zippideedoodah, zipideeday, there's Wordstar.

The sun comes out. Flowers begin to bud and burst into bloom. The cat comes out of hiding. Wordstar 2.2 has arrived.

My troubles, according to the powers that be, appear to be just beginning. A program that works the way it should during the day, but refuses to work at night. How odd.

The blank grey monitor screen seems smug. The red light of my power switch is on. I have contact. The clutch is engaged, the monitor should be monitoring, the disk should be driving.

"Got any ideas?" I ask the cat, who smiles nervously, gulps, and backs out of the room.

Let us pause here to consider philosophy. I am referring, of course, to Murphy's Law. If something can go wrong, it will, at the worst possible moment, and to the greatest possible extent. Why me? Why my computer? I am now considering turning my CoCo into a SCUBA, as my eyes light on the

neighbor's pool. "Hmm. Mysterious sunken CoCo baffles authorities. Sounds good." I can hear my Selectric snickering quietly. "Fine," I say, after all the usual double-checkings of interfaces, power cords and switches. I pick up the phone and call my local Radio Shack, one of several thousand Tandy Help Centers.

"Good evening, Radio Shack."

"Hello. I think I broke my computer."

(Pause) "What computer do you have, sir, and what seems to be the trouble?"

"Are you a technician?"

"No sir, I'm the computer department manager. How can I help you?"

I explained my predicament.

"Are you sure it's plugged in, Sir?" I count to ten silently.

"Hello, are you still there?"

"Yes, yes, I'm here, it's my computer that's dying! It is very definitely, most assuredly, beyond a possible shadow of a reasonable doubt, most certainly, absolutely, positively, plugged in."

"You're sure now? Check again." I count to ten. In Arabic.

"Hello? Hello? Are you there, Sir?"

"Yes," I sigh. "I'm still here. It's plugged in."

"Hmm. Hmm. Well then, it could be a fuse problem."

I perk up. "A fuse, you say?"

"Yes, it could be that. Of course, it isn't user serviceable, in any event . . ."

"No. Of course not."

"If you'd like to bring it in, I'd be happy to take a look at it for you, Sir."

"It's out of warranty."

" . . . for a twenty-five dollar diagnostic fee, applicable towards the work, of course."

"I'm kind of in a desperate hurry . . ."

"Well, of course, Sir, I understand. I'll put it on rush, and I'm sure that if it doesn't need any back-ordered parts, I could

have it back for you pronto. Three weeks, at the outside."

"Three weeks . . ."

"Yes. Now, your name, Sir?"

"Click."

So, there it sits, and here I stand, an impasse. What's a reviewer to do? A bright idea flashes on in my head, and I dig into a lower desk drawer for the manual. On consulting the problem section, I see two suggestions:

1. Try plugging it in.

2. Try prayer.

I figure, what the heck, and about the time that my wife walks in, I have dropped to my knees before my computer.

"Oh no."

"Yup."

"Boom?"

"Boom."

"Prayer?"

"Yes, I've come to that."

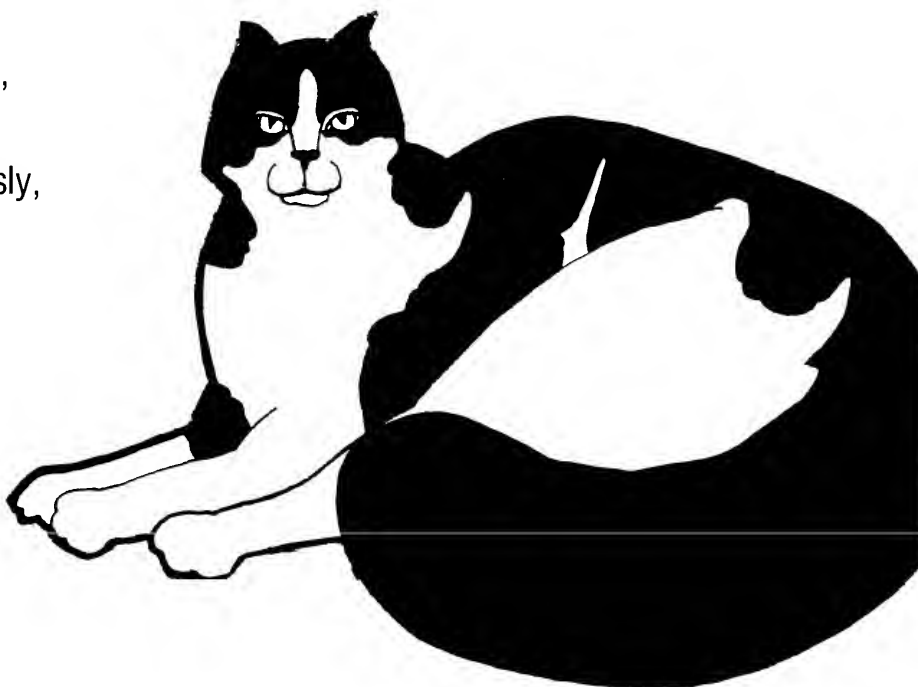
My wife walks over and kicks the machine.

The fireworks from *Love*, *American Style*, and *Walt Disney World* on Sunday nights go off in my forehead. Up comes the drive, on comes the printer, and my screen declares its allegiance to Microsoft. "Honey, would you like a job at Tandy?" I say struggling to my feet.

She laughs, as much from relief as from humor. One more storm averted.

*In the end, it has all worked out pretty well. I am continuing my fortnightly computer ordeals. My wife, having just completed her first book, Step by Step Programming, is hard at work on her second volume, Kickstarting Your Computer, or Zen and the Art of Computer Maintenance. Of course, my wife's kick solution does not work in every instance. There was the one time when I kicked the table, and it fell over . . . (end)*

"Got any ideas?"  
I ask the cat,  
who smiles nervously,  
gulps,  
and backs out  
of the  
room



- To all *TCCM* Summer Programming Project contest finalists:

I am looking for the addresses of the finalists in the programming project contest.

I am looking for your winning entries in *TCCM's* contest. I will pay for your listings if you would only send me your address and price for listing. Please send addresses to: Chris Foster #8 Morris Lane, Texarkana, TX 75503

- In the February 1, 1985 DEFUSR column Terry Kepner stated that the only way to get truly random numbers from RND is to make repeated calls to RND for a random length of time or to write your own RND in assembler. While both of these solutions are workable, it is much easier to use an undocumented feature of RND. RND may be seeded with a starting point by passing it a negative argument. Thus it is possible to get truly random numbers by passing a special Timer variable as a negative argument. Try running the following and you will see a different number between 1 and 10 printed after each machine power-up:

```
10 DUMMY = RND(-TIMER)
20 PRINT RND(10)
```

Like Terry's suggestion of calling RND repeatedly for a random length of time, Timer will be the random length of time between machine power-up and the call to RND (-TIMER).

In addition to using a negative argument to seed RND to a random value, RND may be seeded to a specific value to get repeatable sequences of random numbers sequence of five numbers chosen between 1 and 100:

```
10 FOR I=1 TO 5           50 NEXT J
20 DUMMY=RND(-1)         60 PRINT
30 FOR J=1 TO 5           70 NEXT I
40 PRINT RND(100);
```

In summary:  
RND(0)—Return a random number between 0 and 1.

RND(n)—n-1 return a random number between 1 and n.

RND(n)—n-0 set the random seed. Will cause subsequent calls to RND (0) or RND (n) with n-0 to return the same sequence.

RND(-Timer)—Set the random seed to a random value causing subsequent calls to RND(0) or RND(n) with n-0 to return a true random sequence. **Bill Welch**

- Here is a Poke that I read about somewhere and that makes the RND truly random and does not appear to alter the other operations of Color Computer: POKE 280, PEEK (275).

This may be of especial use to Richard M. Auclair, Westfield, MA. **Paulette Grantham**

A couple of Saturdays ago I phoned you concerning 27128 EPROM, and the use of the Color Burning with disk operation.

As you instructed me, I burned two different DOS's into the 27128. Then, using a 28-pin adapter to interface the EPROM to the 24 pin disk controller ROM socket, I either switched a +5V (thru a 10K resistor) to access the upper 8K or Gnd. to access the lower 8K of the 27128 to pin 26. This I did with

a SPDT mini-toggle switch. With this arrangement I can switch between two different 8K DOS's.

My other problem was to be able to access the complete 16K of the 27128 as one continuous memory. In order to access all 16K in a row, you only have to bend up pin 26 of the 27128 so that it does not go into the 28 pin adapter socket. Solder one end of a short piece of wire to the raised pin 26 and the other end to contact 37 of the connector which plugs into the CoCo. This simple modification gives you access to the full 16K required by Spectrum DOS or KDOS.

I am now using my Green Mountain Color Burner with and at the same time as my disk controller and DOS. All this is possible by using a buffer called Buffer Shack made in Laval, Quebec by Infocodec Inc.. The transformation is very simple and requires modification to the three parts of the Color Burner package.

- \*Hardware\* By cutting the trace on contact 36 of the burner and soldering the cut lead to contact 40. This is all that is required for the burner itself.

- \*Assembly Language Program\* In the A/L Blast program all that needs changing are the three \$FF40's to \$FF80 (lines 890, 1000 and 1160).

- \*Basic Program\* In the Basic Burner program, all the cassette I/O commands are changed to their equivalent disk I/O commands. Other commands such as DIR, RENAME, etc. can easily be added as one chooses.

With these simple modifications, which took about one hour, I have completely eliminated the slow and dull task of having to load and save all object codes to cassette before being able to use my burner. I do not, however, recommend these mods be undertaken by anyone who is not completely familiar with hardware, Assembly Language, and Basic hacking. **Edgar H. Poulin**

## Clubs . . .

- The Mercer County Color Computer Club (MCx) meets the first Wednesday of every month at the Mercer County Public Library, Main Branch, U.S. Route 1, Lawrenceville, N.J. Dues are \$12 per year. On 12/4/84 we had our third meeting with over 30 members.

- The New England Coconuts Color Computer Club is permanent mailing address is: New England Coconuts, P.O. Box 6604, Providence, RI 02940-6604. Contact Robert J. Sullivan, at (401) 739-8743, weeknights or weekends only. We ask all inquiries to include a stamped, self-addressed envelope, and no collect calls, please!

## Manufacturer's Notes:

A year-long site/location study had proven to us that to better service the CoCo marketplace a consolidation of Spectrum Projects Inc. facilities and personnel is in the best interests of all. Therefore, all business operations, orders, and correspondence will be located at our original business address: Spectrum Projects Inc., 93-15 86th Drive, P.O. Box 21272, Woodhaven, New York 11421, phone number (718)441-2807

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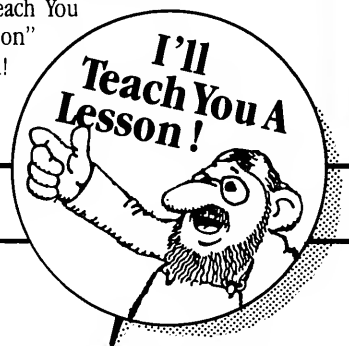
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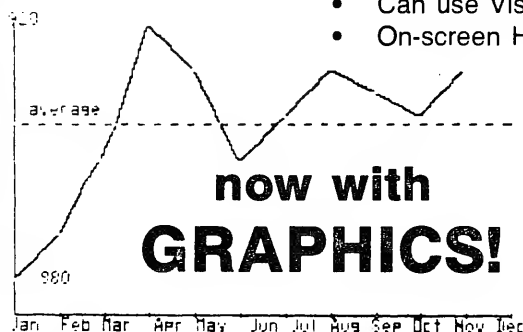
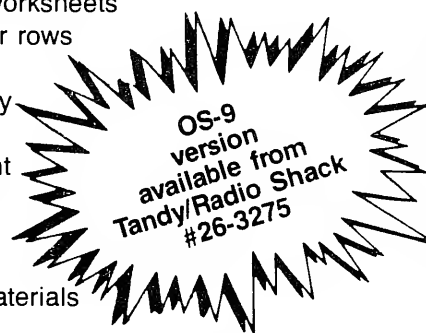
*Scott Norman, HOT CoCo, October, 1984.*

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